EMPATHIC VIRTUAL COACHES

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EMOTIONS

Fundamental dimension of the human experience




Anger *Fear* *Disgust*

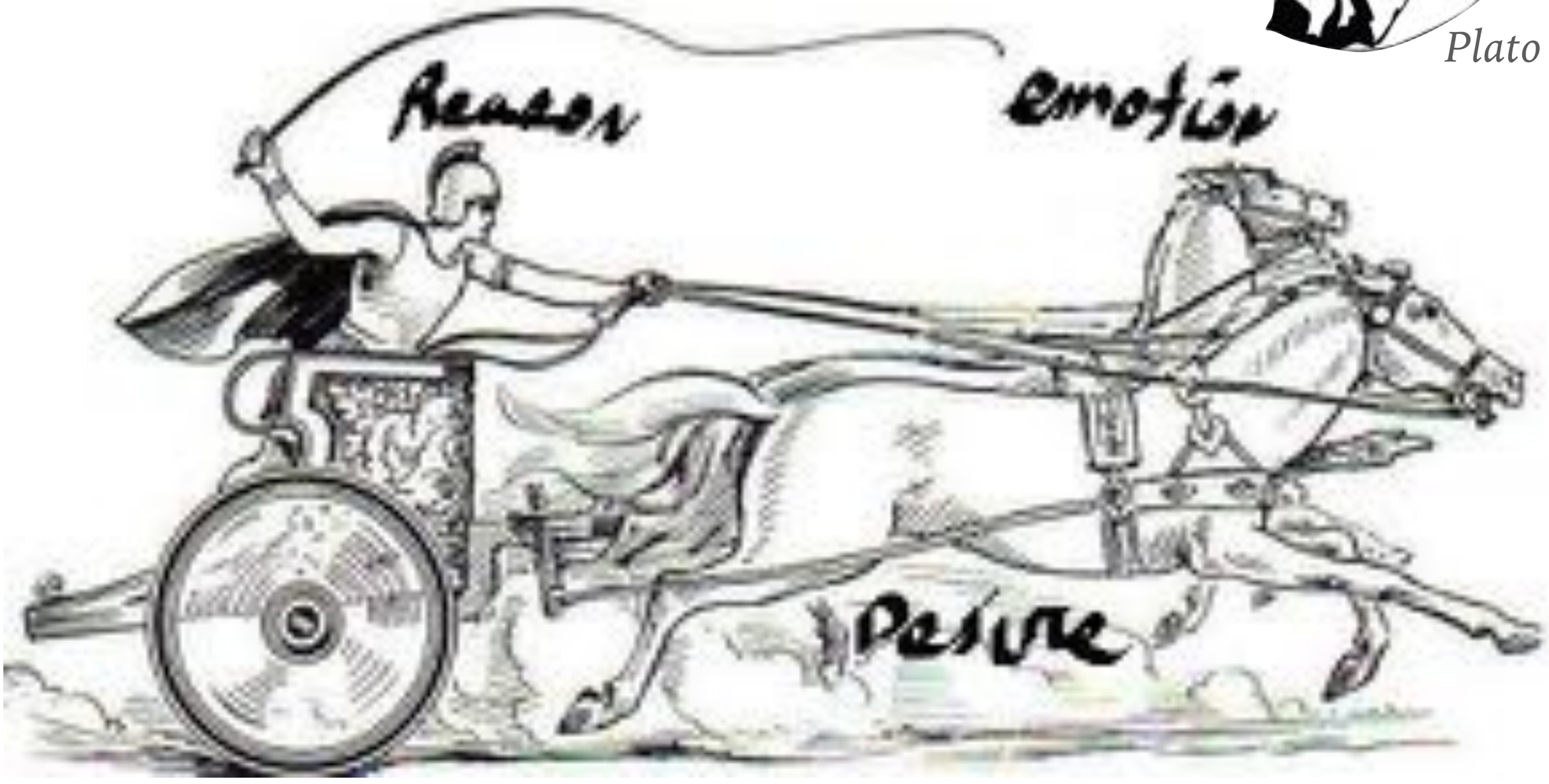
Surprise *Happiness* *Sadness*

Ekman

UNIVERSALITY OF EMOTIONS (EKMAN & FRIESEN 1972)

EMOTION AND REASON (FROM PLATO…)

Plato

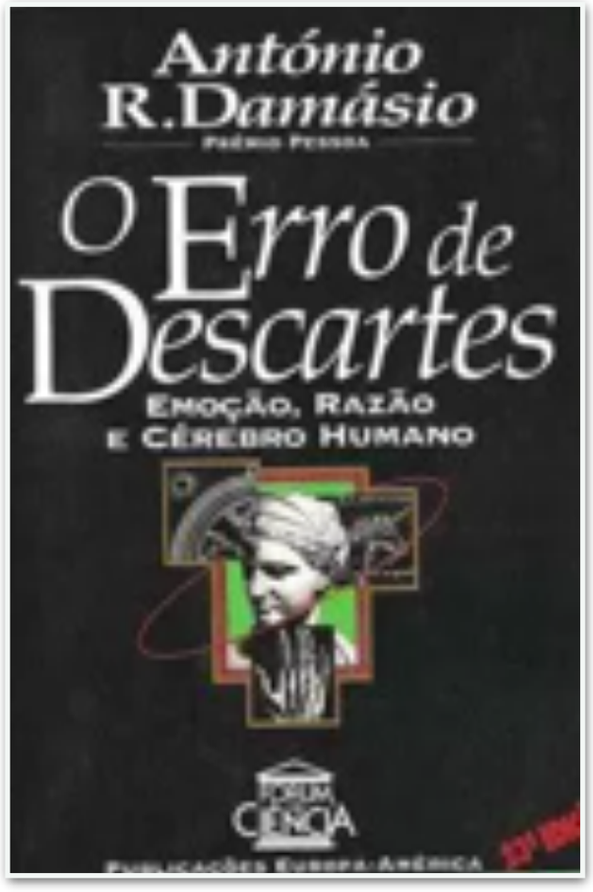


EMOTION AND REASON (. . .TO DAMÁSIO)

Phineas Gage, 1848

António Damásio

Iowa Gambling Task
Bechara et al. 1994



***Somatic Markers**, feelings in the body associated with emotions that influence subsequent decision-making.*

"We are not thinking machines that feel; rather, we are feeling machines that think."

António Damásio, 1994

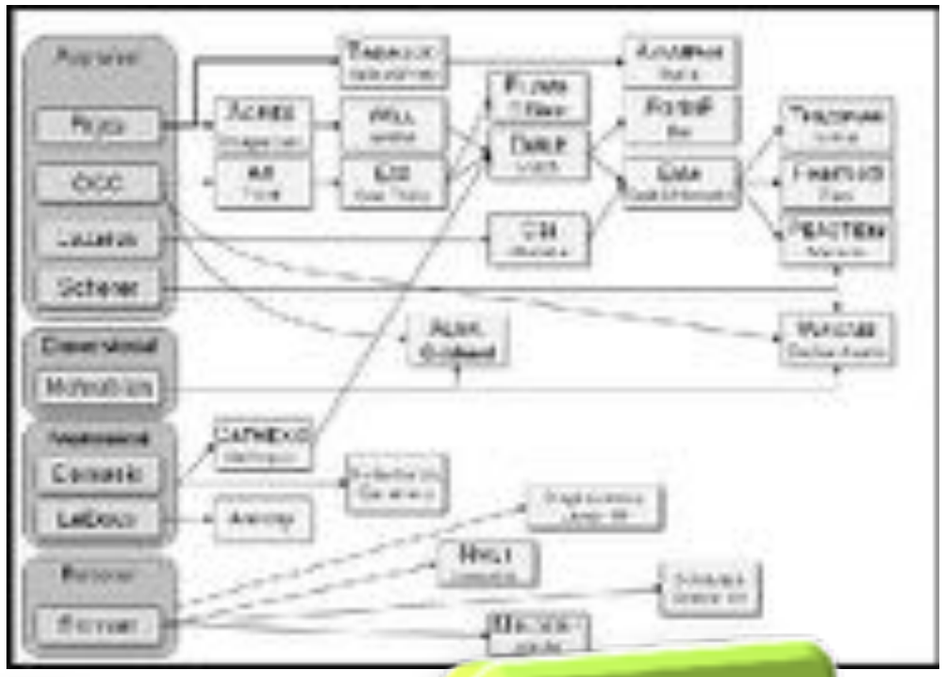
EMOTIONS ARE REQUIRED FOR RATIONAL THOUGHT

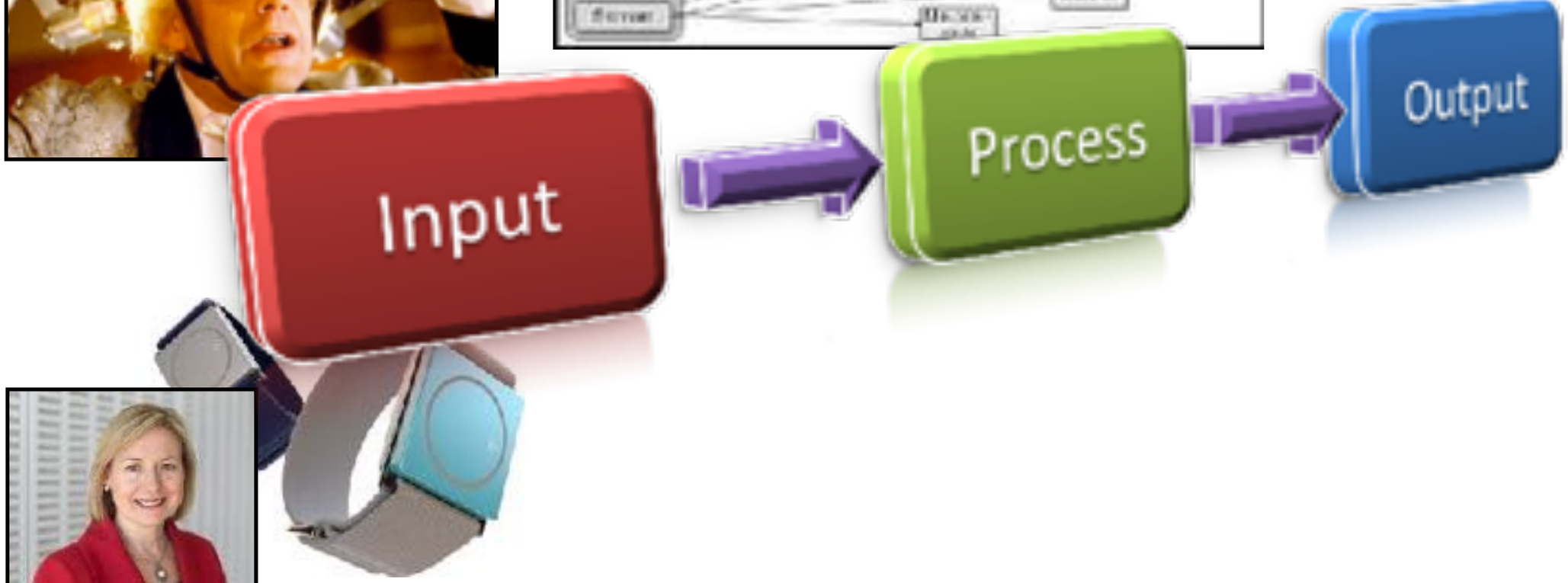
AFFECTIVE COMPUTING

Computing that relates to, arises from, or deliberately influences emotion or other affective phenomena

Empathica

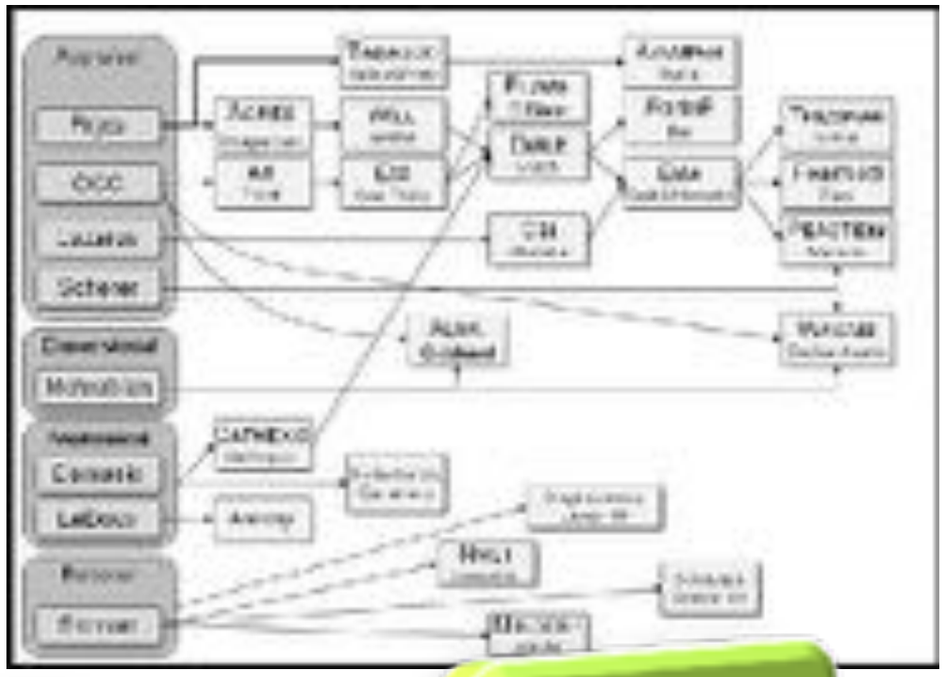
Computational Models of Emotions



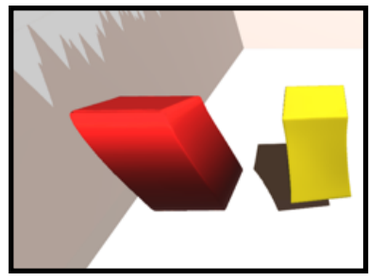


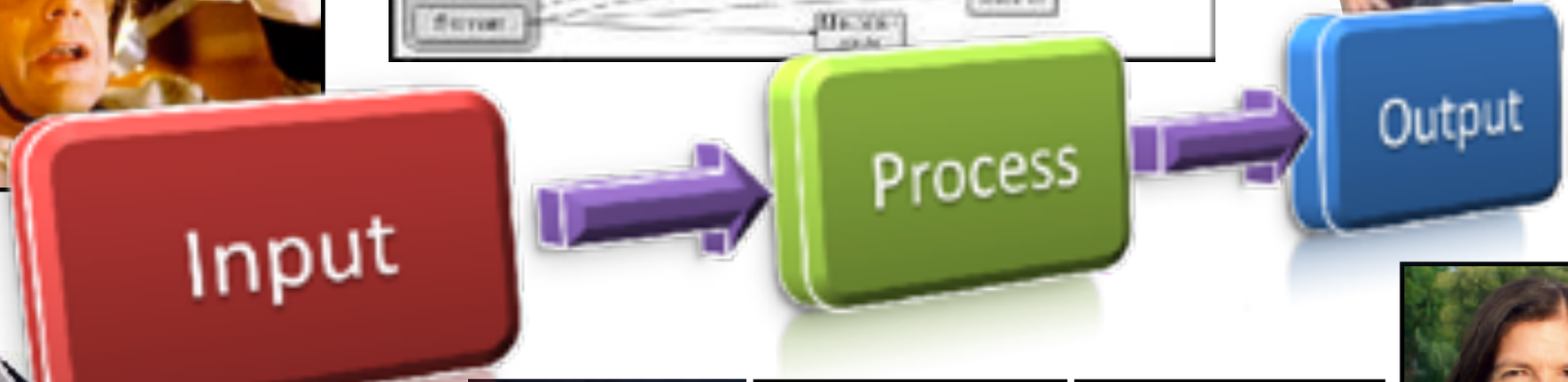
Empathica

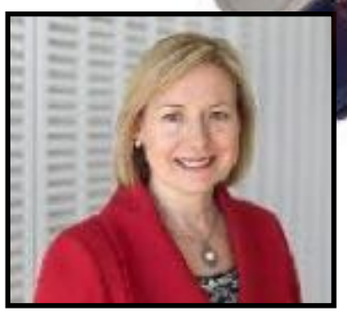
Computational Models of Emotions



Gretta



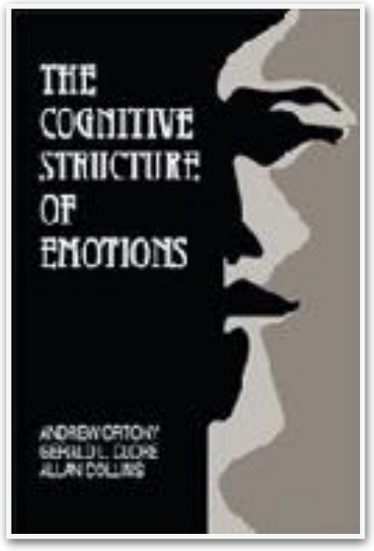




Empathica *Nexi* *Paro* *Emys* *Aini*

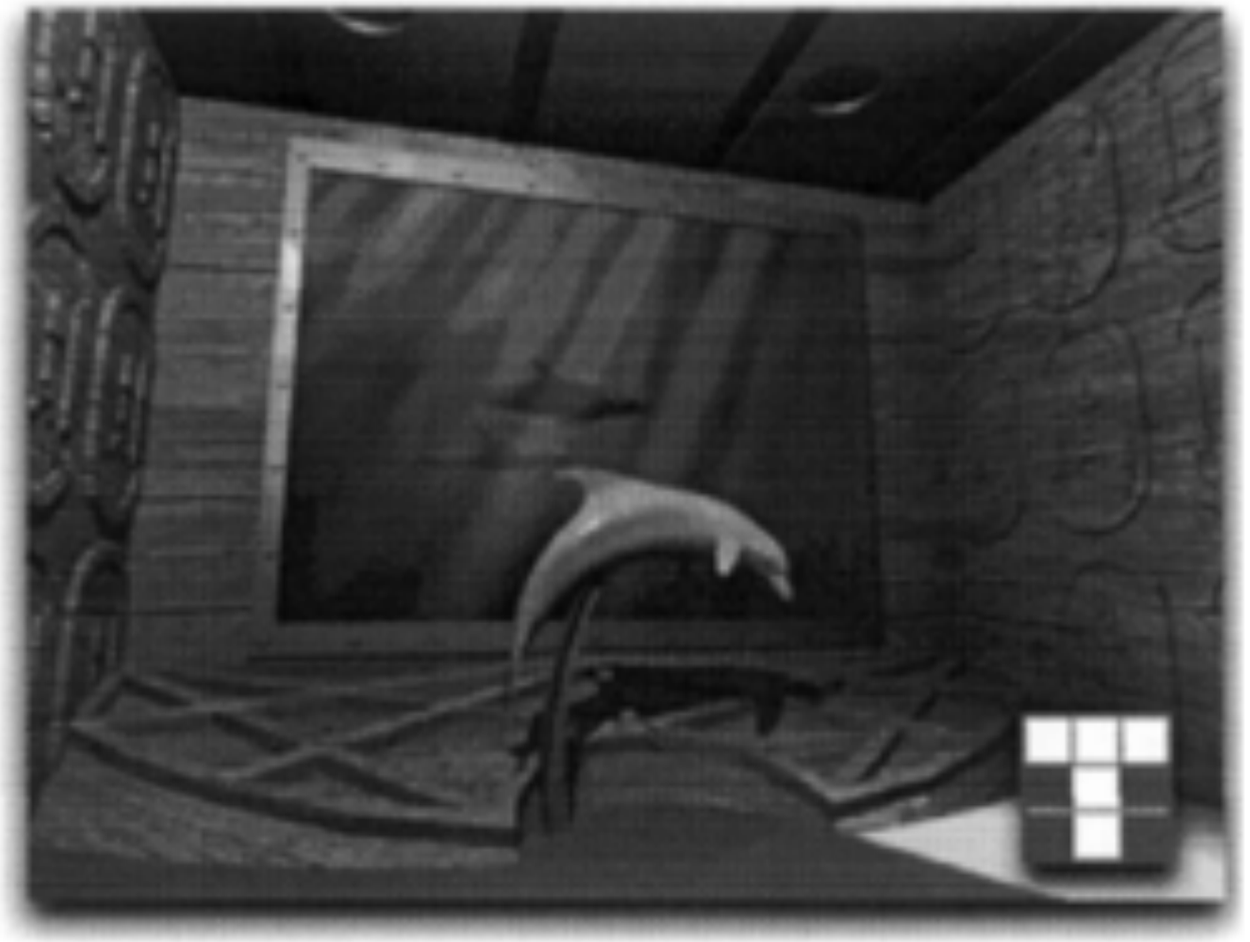
APPRAISAL THEORIES OF EMOTIONS

APPRAISAL THEORIES OF EMOTIONS



Ortony, Clore and Collins
Cognitive Theory of Emotion (1988)

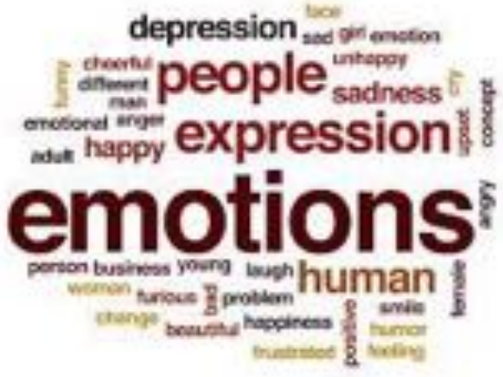
APPRAISAL THEORIES OF EMOTIONS



Martinho et al. 1999

AFFECT CONTINUUM: EMOTION / MOOD / PERSONALITY / CULTURE

emotion *mood* *personality* *time*



Myers-Briggs MBTI

E	S	T	J
I	N	F	P

OCEAN

Openness to experience
Conscientiousness
Extraversion
Agreeableness
Neuroticism

Costa and McCrae FFM

LONG TERM INTERACTION PILLARS

LONG TERM INTERACTION PILLARS

RELATIONSHIP

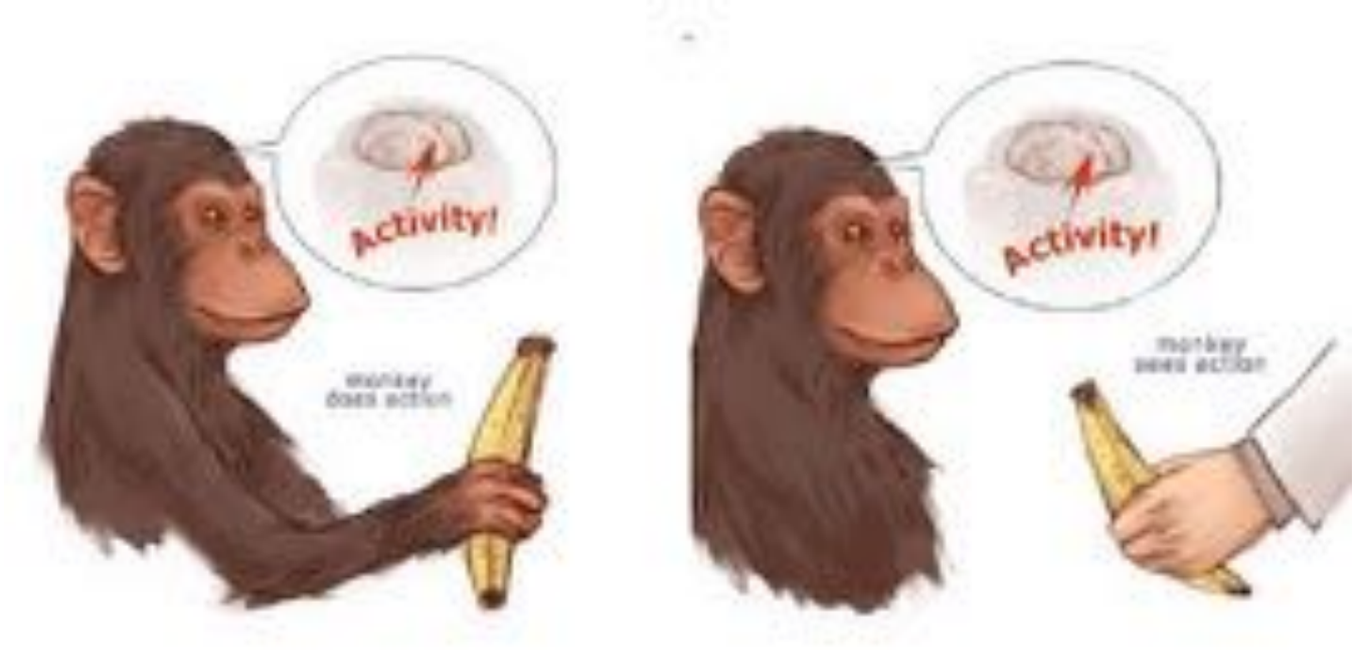
LONG TERM INTERACTION PILLARS

RELATIONSHIP
RAPPORT

LONG TERM INTERACTION PILLARS

RELATIONSHIP
RAPPORT
EMPATHY

EMPATHY: PRE-VERBAL, AUTOMATIC, INVOLUNTARY



More than motor mimicry (Davis, 1996) and mirror neurons (di Pellegrino et al., 1992) empathy is a complex phenomenon.

learning

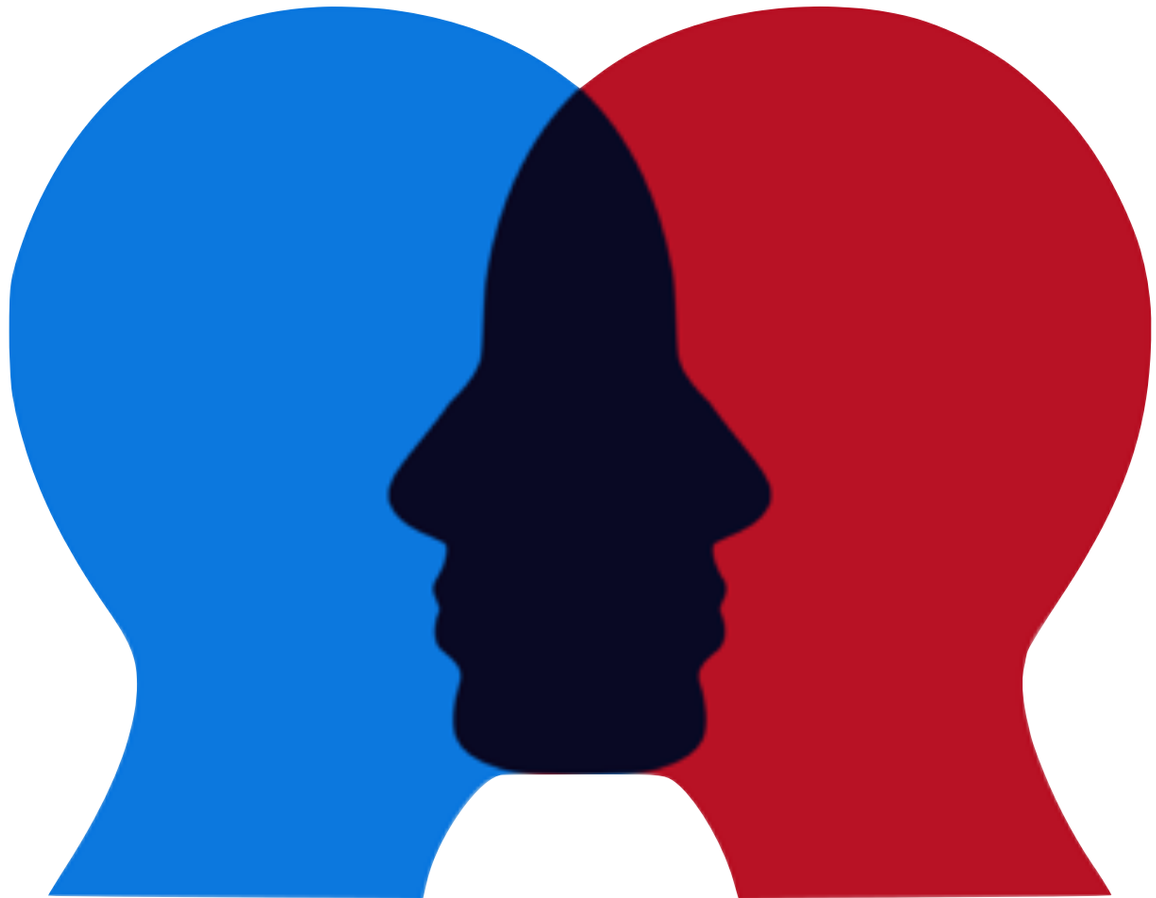
phantom limbs

involuntary

EMPATHY: HIGHER-ORDER COGNITIVE MODES, ASSOCIATED WITH CONSCIOUS MENTAL STATES

Empirical evidence that perspective taking, i.e. "**putting oneself in the other's place and imagining how he or she feels**" (Hoffman 2001) is **more** empathy arousing.

PERSPECTIVE TAKING
THEORY OF MIND



ARTIFICIAL EMPATHY IMPACTS LONG-TERM INTERACTION

Leite et al., 2013

iCat help student (8-10) train at a chess club for 5 weeks (individual and group interaction)

Adaptive empathic behaviour helps maintaining social presence and mitigate the novelty effect.

VIRTUAL COACHES

Project "Tutoria Virtual"
TDC/IVC-PEC/3963/2014

inesc id lisboa

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Ciências ULisboa

UNIVERSIDADE ABERTA www.uab.pt

FCT Fundação para a Ciência e a Tecnologia

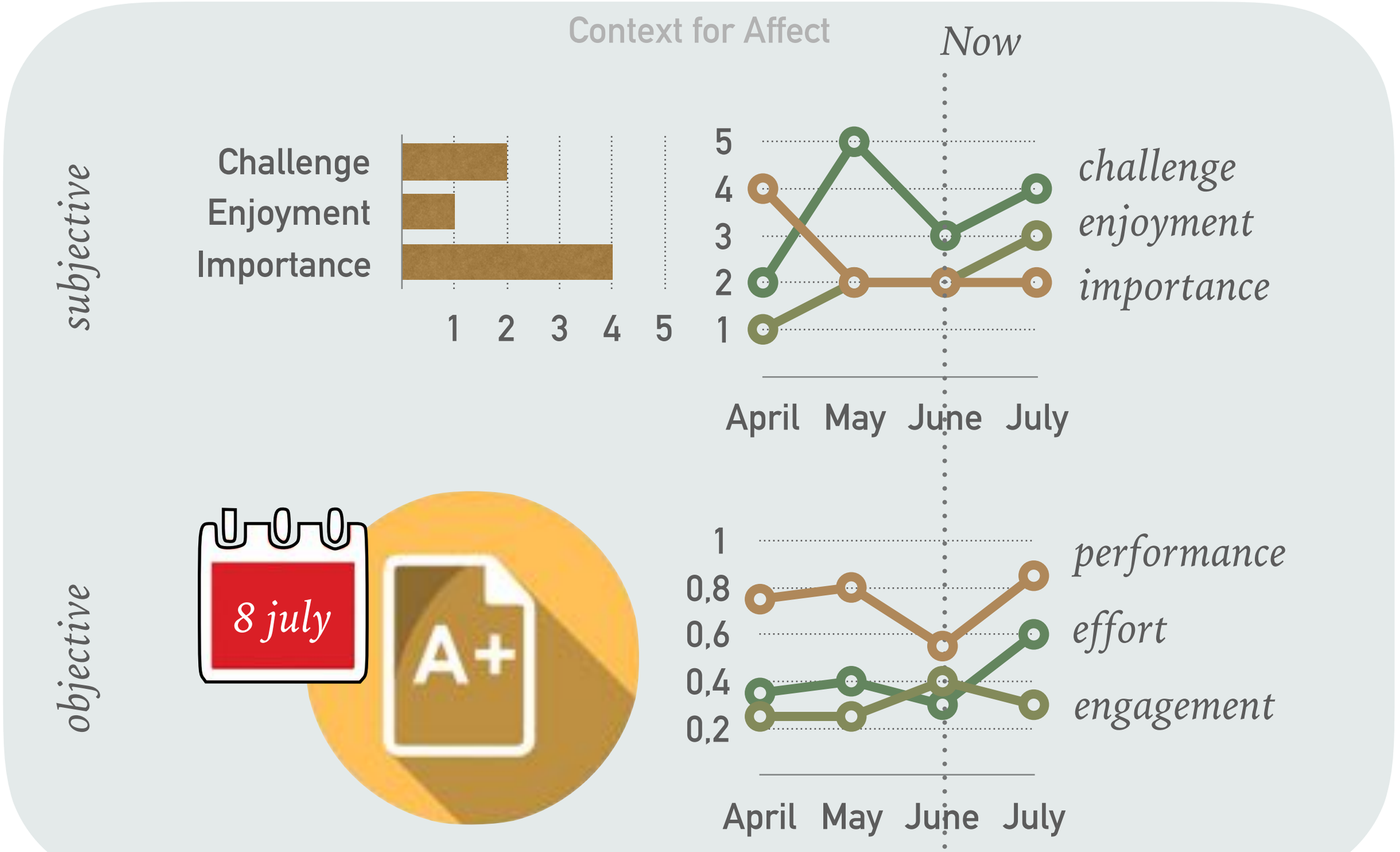
Social Regulatory Cycle

informação *subjetiva e objetiva* do aluno

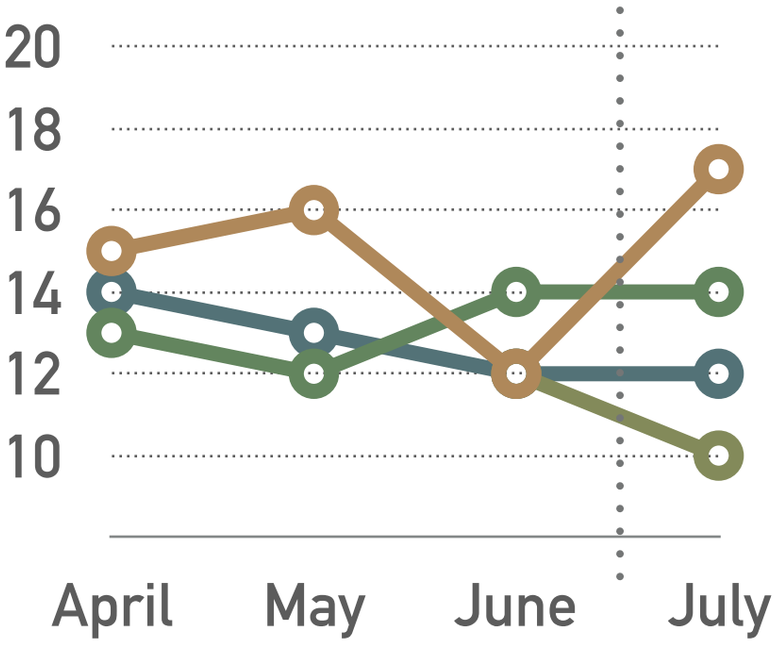
1. avaliação afetiva

Social Regulatory Cycle

SENSING AFFECT



Example: performance



individual

class

expected class

expected individual

	more R	as expected	more P
expected R	stronger R (S+)	expected R	weaker R ($+)
negligible	unexpected R	negligible	unexpected P
expected P	weaker P ($-)	expected P	stronger P (S-)

Martinho, 2006

user

personality filter

personality filter

informação *qualitativa* e *quantitativa* do aluno

1. avaliação afetiva

2. seleção de estratégia

Final Classification of Controlled Interpersonal Affect Regulation Strategies

	Strategies to improve affect	Strategies to worsen affect
Engagement strategies	Positive engagement	Negative engagement
	Affective engagement: Directly trying to improve the way the target feels about a situation, e.g., allowing the target to vent	Affective engagement: Directly trying to worsen the way the target feels about a situation, e.g., explaining how the target has hurt someone
	Problem-focused strategies, e.g., listening to the target's problems	
	Target-focused strategies, e.g., pointing out the target's positive characteristics	
	Cognitive engagement: Trying to change the way the target thinks about a situation in order to improve the target's feelings, e.g., giving the target advice	Behavioral engagement: Trying to change the way the target behaves in relation to a situation in order to worsen the target's feelings, e.g., complaining about the target's behavior
Relationship-oriented strategies	Acceptance	Rejection
	Attention: Giving the target attention to communicate validation, e.g., making it clear that you care about the target	Rejecting the target's feelings: Rejecting the target's feelings to communicate snubbing, e.g., making it clear that you do not care how the target feels
	Valuing, e.g., making the target feel special	Confrontational strategies, e.g., being rude to the target
	Distraction, e.g., arranging an activity for the target	Nonconfrontational strategies, e.g., ignoring the target
	Humor: Being humorous towards the target to communicate validation, e.g., joking with the target	Putting one's own feelings first: Putting one's own feelings first to communicate snubbing, e.g., sulking around the target

K. Niven, P. Totterdell and D. Holman (2009): "A Classification of Controlled Interpersonal Affect Regulation Strategies". In Emotion 9:4.

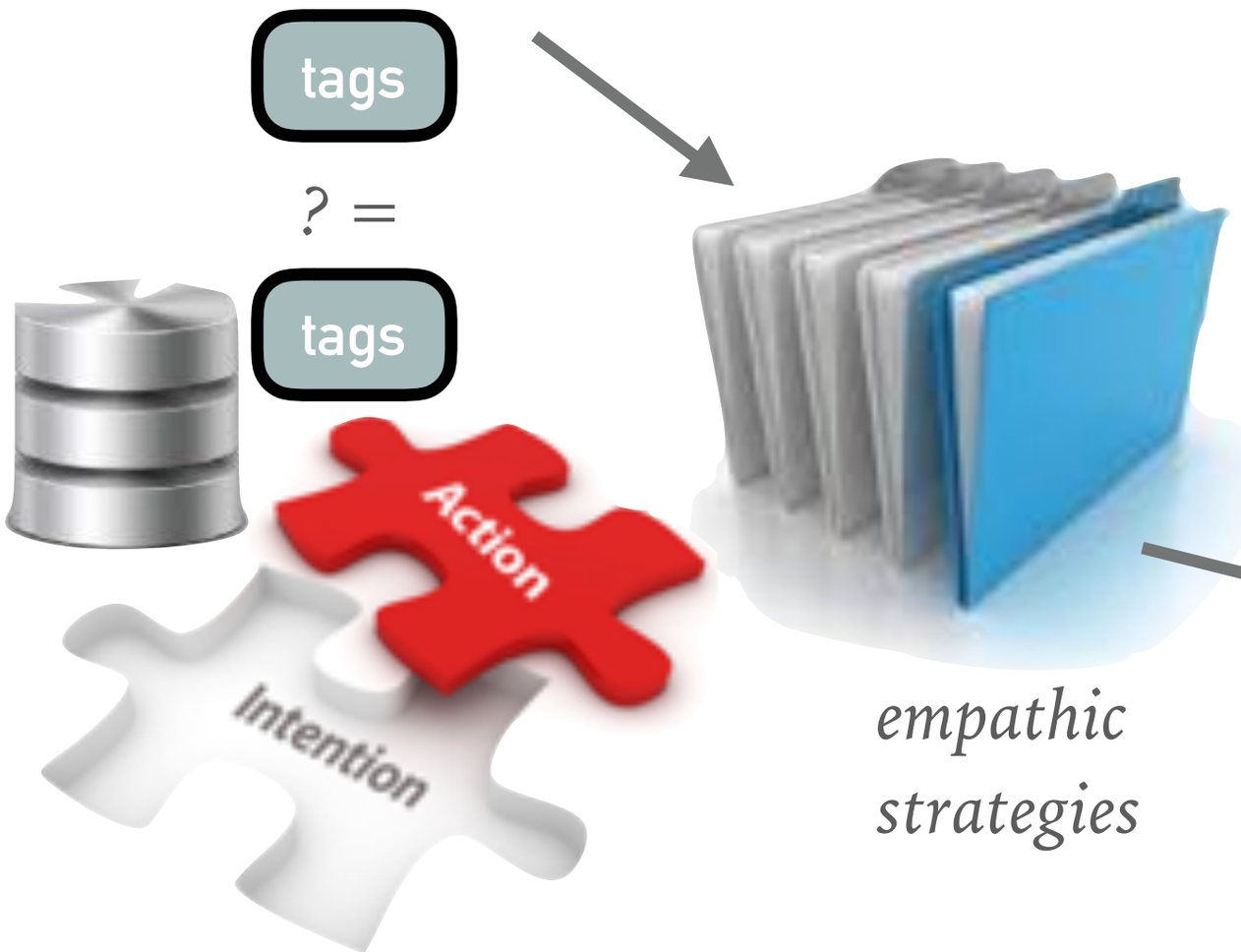
informação *qualitativa* e *quantitativa* do aluno

1. avaliação afetiva

2. seleção de estratégia

3. escolha do diálogo

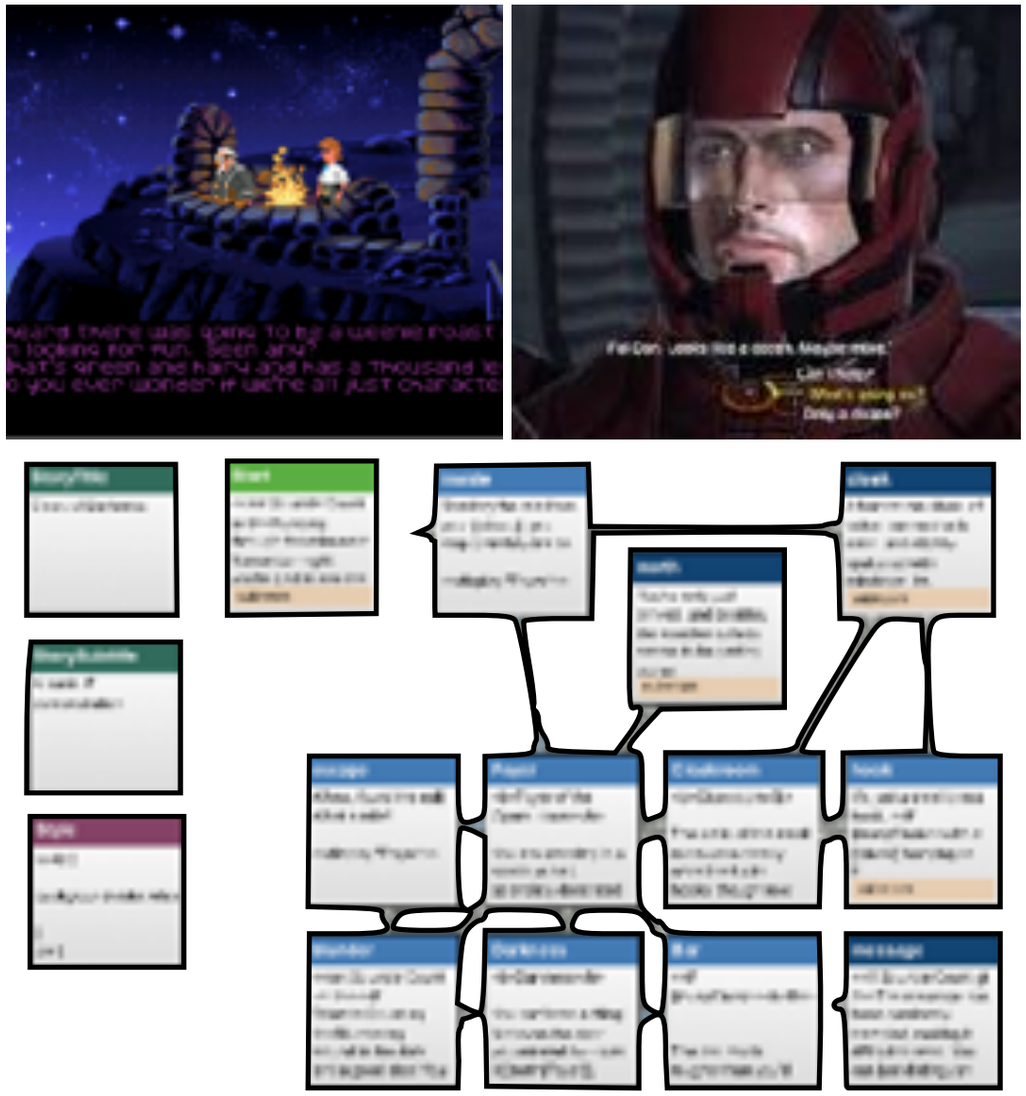
3-party affect and multi-dimensional individual and class context



empathic strategies

The Secret of Monkey Island, LucasArt, 1990

Mass Effect Bioware, 2007



dialog tree (Yarn)

informação *qualitativa e quantitativa* do aluno

interação *verbal e não verbal* com o aluno

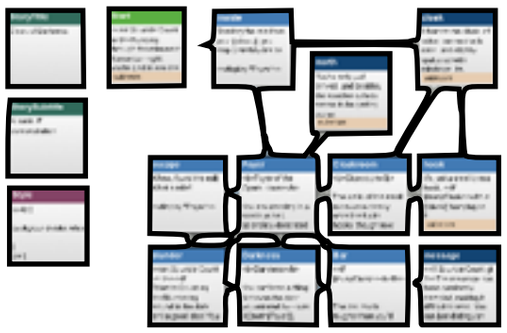
1. avaliação afetiva

2. seleção de estratégia

3. escolha do diálogo

4. gestão do diálogo

EXPRESSING AFFECT



Affective expression, head animation and back-channeling

Dialog Manager

syncs

Update affective background

Speech balloon and text animation

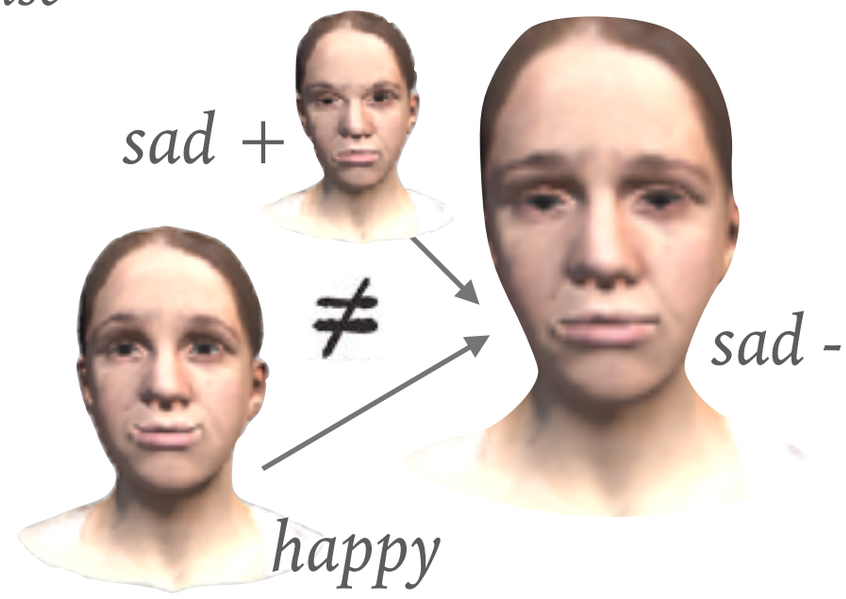
user input

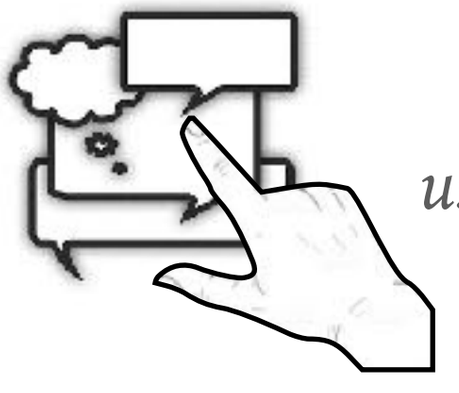
Affect dynamics using:

- Ekman's 6 basic emotions

- Gaze and nodding

- Noise





Emotion-based text animation

Emotion-based speech balloon

student affective state disclosure

Maria's affective state and intention disclosure

João's affective state and intention disclosure

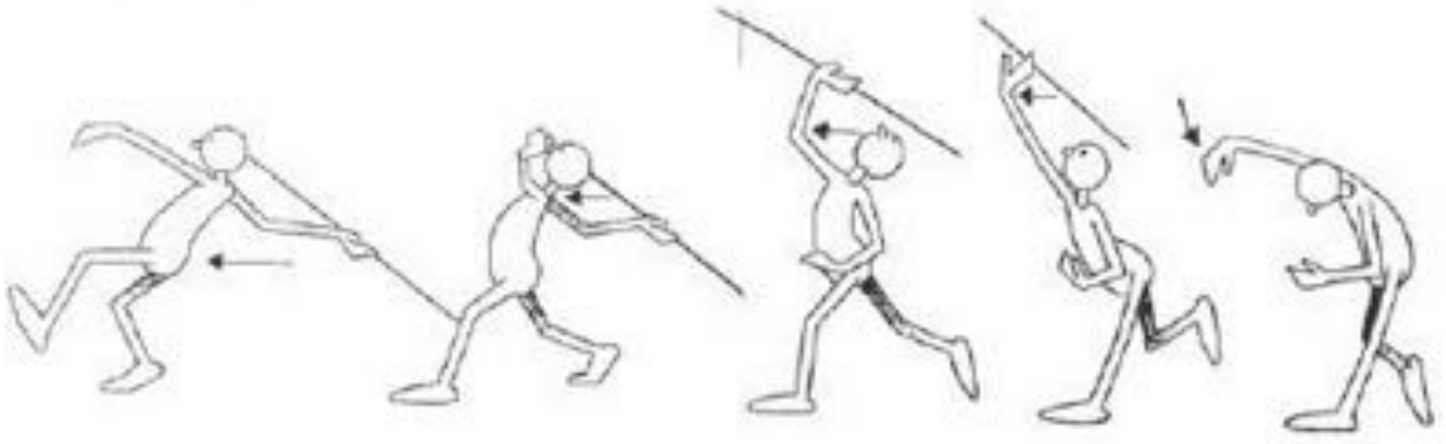
Maria is more permissive, more forgiving, kinder and gentler.

João is more exigent, pressing and demanding than Maria.

Both complement each other and provide a richer interaction.

FUTURE WORK

Principles of traditional animation (Johnston and Thomas, 1981)



Traditional Action

expands to…

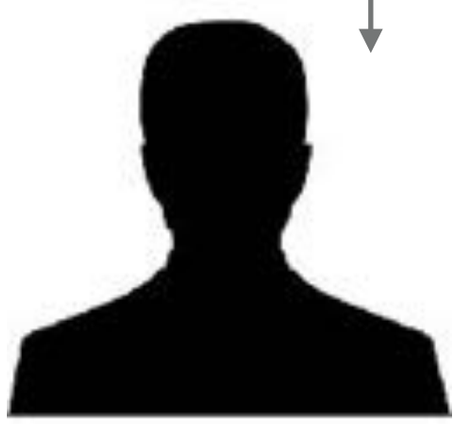
Interruptible Anticipation

Uninterruptible Anticipation

Action

Follow Through

Affect Communication



CONCLUSIONS

- Emotions are essential for rational decision-making
- Affective Computing has developing systems based on emotions
- Computer interaction may be modulated by artificial empathy through emotional regulation
- The virtual coaches are an example of this approach

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